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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/021,185	12/07/2001	C. David Capps	97-122	5342

7590

12/16/2003

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EXAMINER
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HARRINGTON, ALICIA M

ART UNIT	PAPER NUMBER
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2873

DATE MAILED: 12/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/021,185

Applicant(s)

CAPPS, C. DAVID

Examiner

Alicia M Harrington

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on 07 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 1 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Information Disclosure Statement*

1. The information disclosure statement filed on 12/7/01 has been considered by the Examiner.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 10 and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Miracky et al (US 2002/0105699).

Regarding claims 10 and 12, Miracky discloses an optical beam steering system for steering an optical beam, comprising:

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- a) a small angle beam steerer (MEMS-400; see section 85-89) for receiving a collimated laser beam and redirecting said collimated laser beam through a small angular deviation.
- b) an optics system having (470) a focal plane and an optical axis, said optics system for focusing said redirected laser beam onto said focal plane; and,
- c) a plurality of detector elements (480) positioned on said focal plane, each capable of receiving the focused laser beam from a desired direction without a need for mechanical gimbals, said desired direction capable of covering a large angular range with respect to said optical axis.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-9 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sandler et al (US 2002/0122619) in view of Grinberg et al (US 5,141,814).

Regarding claims 1, Sandler discloses an optical beam steering system for steering an optical beam (200), comprising:

- a) an optics system (102) having a focal plane and an optical axis;
- b) a plurality of source elements (104) positioned on said focal plane, each capable of providing a point source of radiation to said optics system, said optics system providing a collimated output; and,
- c) an angle beam steerer (202 or 204- MEM or other beam steering devices known in the art- see sections 84-85) for receiving said collimated output and redirecting said collimated output through a small angular deviation, the redirected output thus being transmitted in a desired direction without a need for mechanical gimbals, said desired direction capable of covering a large angular range with respect to said optical axis (see sections 26-29).

However, Sandler fails to specifically disclose where the beam steering was for small angles.

Grinberg discloses another type of beam steering device (phase optical array) that redirects a beam by small angular deviation (a few degrees) in an embodiment (see col. 16, lines 6-10). Grinberg teaches the

beam steering can be implemented in many application that need large or small beam steering. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a optical phase beam steering for redirecting beams without the need for mechanical gimbals through small deviations, as taught by Grinberg, since it is simple to manufacture and easily controlled.

Regarding claim 2, Sandler is silent the range of angle steering. Grinberg teaches the angular range can vary from a few degrees to forty degrees.

Thus, it is capable of 0 to 5 degree steering angles. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to made to optical phase arrays, as taught by Grinberg, since is simple to manufacture and useable in a wide range of beam steering applications.

Regarding claim 3, Sandler and Grinberg discloses the small angle beam steerer comprises an optical phased array.

Regarding claim 4, Sandler and Grinberg fail to specifically disclose wherein said optics system comprises a wide-angle lens. Sandler uses an array of micro lenses to focus the beams over the angular range. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a wide angle lens to assure the beams impinges over the are of the fiber optic array since it would provide the equivalent function of

directing the beams to the fibers over the entire array and such implementation would be within routine skill in the art.

Regarding claim 5, Sandler discloses each source element comprises an end of a single mode optical fiber (see section 7).

Regarding claim 6, Sandler discloses a plurality of source elements comprise a plurality of laser diodes (see section 9).

Regarding claim 7, Sandler discloses wherein said plurality of source elements comprises a plurality of vertical cavity surface emitting lasers (VCSEL) (see section 9).

Regarding claim 8, Sandler discloses wherein said plurality of source elements comprises a two-dimensional optical fiber array (see section 27 and 30).

Regarding claim 9, Sandler discloses wherein said plurality of source elements comprises an optical switching network (see abstract).

Regarding claim 16, Sandler discloses a method for optical beam steering, comprising the steps of:

a) providing a point source of radiation to an optics system from a focal plane of said optics (102 and 104) system, said optics system providing a collimated output and,

b) redirecting said collimated output through angular deviation utilizing an angle beam steerer, the redirected output thus being transmitted in a desired direction without a need for mechanical gimbals, said desired direction capable of covering a large angular range with respect to an optical axis of said optics system (202 or 204; see sections 26-29). However, Sandler fails to specifically disclose where the beam steering was for small angles.

Grinberg discloses another type of beam steering device (phase optical array) that redirects a beam by small angular deviation (a few degrees) in an embodiment (see col. 16, lines 6-10). Grinberg teaches the beam steering can be implemented in many application that need large or small beam steering. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a optical phase beam steering for redirecting beams without the need for mechanical gimbals through small deviations, as taught by Grinberg, since it is simple to manufacture and easily controlled.

Regarding claim 17, Sandler is silent the range of angle steering. Grinberg teaches the angular range can vary from a few degrees to forty degrees. Thus, it is capable of 0 to 5 degree steering angles. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to made to include an optical phase array, as taught by Grinberg, since is



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simple to manufacture and useable in a wide range of beam steering applications.

Regarding claim 18, Sandler and Grinberg discloses wherein said step of redirecting said collimated output comprises utilizing an optical phased array (see section 27).

Regarding claim 19, Sandler uses an array of micro lenses to focus the beams over the angular range. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a wide angle lens to assure the beams impinges over the area of the detector array since it would provide the equivalent function of directing the beams to the detectors over the entire array and such implement would be within routine skill in the art.

6. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miracky et al (US 2002/0105699) in view of Grinberg et al (US 5,151, 814).

Regarding claim 11, Miracky discloses the steering angle of 10 degrees. However, Miracky fails to specifically disclose wherein said small angle beam steerer is capable of steering in a range of about 0 to 5 degrees.

Grinberg discloses another type of beam steering device (phase optical array) that redirects a beam by small angular deviation (a few degrees) in an embodiment (see col. 16, lines 6-10). Grinberg teaches the beam steering can be implemented in many application that need large or small beam steering. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a optical phase beam steering for redirecting beams without the need for mechanical gimbals through small deviations, as taught by Grinberg, since it is simple to manufacture and easily controlled an the phase array discloses by Grinberg is a function equivalent to the MEMs array.

7. Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miracky et al (US 2002/0105699).

Regarding claim 13 Miracky fails to specifically disclose in an embodiment wherein said optics system comprises a wide-angle lens. Miracky uses an array of micro lenses to focus the beams over the angular range. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a wide angle lens to assure the beams impinges over the area of the detector array since it would provide the equivalent function of

directing the beams to the detectors over the entire array and such implement would be within routine skill in the art.

Regarding claims 14 and 15, Miracky fails to specifically disclose embodiments wherein said plurality of detector elements comprises PIN's or APD's. However, the Examiner takes official notice that these detectors are well-known detectors used in telecommunication systems. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Miracky, to include this feature, since they are well known and can be readily manufactured for use in micro-optical technology systems.

### *Conclusion*

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Paul F. McManamon et al discloses a published article entitled Optical Phased Array Technology (cited on the IDS).

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alicia M Harrington whose telephone number is 703 308 9295. The examiner can normally be reached on Monday - Thursday 9:30-6:00.

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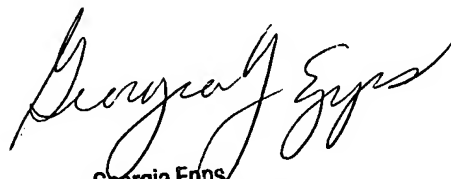
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on 703 308 4883. The fax phone number for the organization where this application or proceeding is assigned is 703 872 9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0956.



AMH

Alicia M Harrington  
Examiner  
Art Unit 2873



Georgia Epps  
Supervisory Patent Examiner  
Technology Center 2800